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24337 7590 07/11/2008

MILLER PATENT SERVICES
2500 DOCKERY LANE
RALEIGH, NC 27606

EXAMINER

ELPENORD, CANDAL

ART UNIT

PAPER NUMBER

2616

DATE MAILED: 07/11/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,961	12/22/2005	Leon Towns-von Stauber	PCI-001	3083
TITLE OF INVENTION: QUALITY DETERMINATION FOR PACKETIZED INFORMATION				

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$720	\$300	\$0	\$1020	10/14/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,961	12/22/2005	Leon Towns-von Stauber	PC1-001	3083
TITLE OF INVENTION: QUALITY DETERMINATION FOR PACKETIZED INFORMATION				

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nonprovisional	YES	\$720	\$300	\$0	\$1020	10/14/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
ELPENORD, CANDAL	2616	370-252000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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24337	7590	07/11/2008	EXAMINER	
MILLER PATENT SERVICES 2500 DOCKERY LANE RALEIGH, NC 27606			ELPENORD, CANDAL	
			ART UNIT	PAPER NUMBER
			2616	

DATE MAILED: 07/11/2008

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 392 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 392 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/561,961

Examiner

CANDAL ELPENORD

Applicant(s)

TOWNS-VON STAUBER ET AL.

Art Unit

2616

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to June 23, 2008.
2. ☒ The allowed claim(s) is/are 1-14, 17-49, 51-53, 65-68, renumbering as 1-54 respectively.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date December 22, 2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

Reasons For Allowance

1. The following is an Examiner's statement of reasons for allowance:

Claims 1-54 are allowed.

The present invention is directed toward a method for near real time quality analysis in which packets are passively sampled using a quality analyzer during a communication session between a pair of end points. A plurality of metrics are determined from the sampled packets including lost packets, packet timing, then a quality score is determined in near real time that combines the metrics.

Regarding independent claim 1, a near real time quality analyzer, comprising: a passive stream collector that passively samples packets from a stream Of Internet Protocol (IP) packets that represent a communication session between a pair of end points carrying analog signals being transmitted over a transmission path in an IP network, and determines in near real time at least two metrics from the sampled packets for the communication session; wherein the at least two metrics comprise: at least one metric that measures a quantity of lost packets; and at least one metric that measures a characteristic of packet a stream quality analyzer that receives the at least two metrics and calculates a quality score in near real time using a quality formula that combines the at least two metrics; and wherein the quality formula takes the general form of: $Q = K1 + \ln(K2 + K3J) + \exp(K4P)$ where Q is the quality score, the values of K1, K2, K3 ,K4 and are constants, J is jitter, and P is packet loss.

Regarding claim 26, a near real time quality analyzer, comprising: a passive stream collector that passively samples packets from a stream of Real Time Protocol (RTP) Internet Protocol (IP) packets entering and leaving a switch, wherein the stream of packets represents a communication session between a pair of end points carrying analog signals being transmitted over a transmission path in an IP network, and determines in near real time at least two metrics from the sampled packets for the communication session; wherein the at least two metrics are derived from data contained within Real Time Control Protocol packets comprise: at least one metric that measures a quantity of lost packets; and at least one metric that measures a characteristic of packet jitter a stream quality analyzer that receives the at least two metrics and calculates a quality score in near real time using a quality formula that combines the at least two metrics, wherein the stream quality analyzer aggregates a plurality of quality scores, and wherein the quality formula takes the general form of: $Q = K + \ln(K2 + K3J) + \exp(K4P)$ where Q is the quality score, the values of K1, K2, K3, and K4 are constants, J is jitter, and P is packet loss; a database, receiving the quality score from the stream quality analyzer and storing the quality score indexed to the pair of end points; means for comparing the quality score with a quality threshold and generating an alarm whenever the quality score falls below a quality threshold; and a display that displays the quality score along with historical quality scores associated with the end points.

Regarding claim 29, a method for near real time quality analysis, comprising: passively sampling packets from a stream of Internet Protocol (IP) packets that

represent a communication session between a pair of end points carrying analog signals being transmitted over a transmission path in an IP network, and determining in near real time at least two metrics from the sampled packets for the communication session; wherein the at least two metrics comprise: at least one metric that measures a quantity of lost packets; at least one metric that measures a characteristic of packet latency; calculating a quality score in near real time using a quality formula that combines the at least two metrics; and wherein a packet latency metric is modeled in the quality formula as either an exponential term or a piecewise linear function in which the overall quality score shows a sharp decline in quality when packet latency exceeds approximately 150 ms and a low effect on quality score when packet latency is below approximately 150 ms.

Regarding claim 52, a near real time quality analyzer, comprising: a passive stream collector that passively samples packets from a stream of Internet Protocol (IP) packets that represent a communication session between a pair of end points carrying analog signals being transmitted over a transmission path in an IP network, and determines in near real time at least two metrics from the sampled packets for the communication session; wherein the at least two metrics comprise: at least one metric that measures a quantity of lost packets; at least one metric that measures a characteristic of packet timing; and a stream quality analyzer that receives the at least two metrics and calculates a quality score in near real time using a quality formula that combines the at least two metrics; and wherein the quality formula takes the general form of: $Q = K_s - K6L + K7R + K8J$ where Q is the quality score, K_s , K6, KT, and K8 are

constants, L is latency, R is the sum of the squares of round-trip times, where round-trip time is the combined latency for transit between the pair of end points, and J is a minimum positive jitter.

Regarding claim 53, a method for near real time quality analysis, comprising: passively sampling packets from a stream of Internet Protocol (IP) packets that represent a communication session between a pair of end points carrying analog signals being transmitted over a transmission path in an IP network, and determining in near real time at least two metrics from the sampled packets for the communication session; wherein the at least two metrics comprise: at least one metric that measures a quantity of lost packets; at least one metric that measures a characteristic of packet timing; calculating a quality score in near real time using a quality formula that combines the at least two metrics and wherein a packet loss metric is modeled in the quality formula as either an exponential term or a piecewise linear function in .which the overall quality score shows a sharp decline in quality when packet loss exceeds a threshold.

The closest prior arts, Puthiyedath '521 discloses method and system of analyzing the perceived quality of stream media, determining whether there are missing data packets from the received stream as referenced by fig. 1, analyzer 104, col. 3, lines 45-61, col. 2, lines 26-67. Puthiyedath '521 further discloses a device (fig. 1, Device 110, col. 3, lines 45-62) produces a quality score (fig. 1, Device 110, col. 3, lines 45-62) using the analyzer 104 (fig. 1, col. 3, lines 45-62, col. 5, lines 39-62).

Klinker '671 from the same field of endeavor discloses a passive flow analyzer as referenced by fig. 3, Passive Flow Analyzer 330, fig. 2, Passive Calibrator 203, which examines the traffic stream at both ends (ingress/egress) with respect to round trip latency, percentage of packet lost, jitter of the traffic flows, paragraphs 0077-0078, 0082, 0104, 0107.

MeLampy '781 from the same field of endeavor discloses determining dynamically a QoS score in terms of packet lost, jitter, latency of the multimedia packet flows as suggested in col. 13, lines 52- to col. 14, lines 3.col. 16, lines 67 to col. 17, lines 32.

Baj '979 from the same field of endeavor discloses determining/measuring the (PSQM) Perceptual Speech Quality Measurement ranging from 1 to 5, paragraphs 0006-0007, 0009, and 0037.

The combined prior arts in combination fail to teach the above claimed features: wherein the quality formula takes the general form of: $Q = K + \ln(K_2 + K_3J) + \exp(K_4P)$ where Q is the quality score, the values of K1, K2, K3, and K4 are constants, J is jitter, and P is packet loss; wherein a packet latency metric is modeled in the quality formula as either an exponential term or a piecewise linear function in which the overall quality score shows a sharp decline in quality when packet latency exceeds approximately 150 ms and a low effect on quality score when packet latency is below approximately 150 ms; wherein a packet loss metric is modeled in the quality formula as either an

exponential term or a piecewise linear function in .which the overall quality score shows a sharp decline in quality when packet loss exceeds a threshold.

The prior arts in combination fail to anticipate or render the distinct features of the independent claims obvious.

Dependent claims 19-25, 27-28, 30-51, and 54 are allowed since they depend on claims 1, 26, 29, 53 respectively.

2. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sheldon et al (US 7,061,871 B2), Hardy et al (US 6370120 B1), Asar et al (US 7,197,557 B1), Procopio et al (US 2003/0007458 A1), Bruckman et al (US 2003/0048754 A1), Hicks et al (US 7274670 B2), Chong et al (US 7382735 B2), Hussain et al (US 2003/0223361 A1), Clark et al (US 7,075,981 B1), Houh et al (US 2002/0015387 A1), and Mitsumori et al (US 6,850,525 B2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CANDAL ELPENORD whose telephone number is (571)270-3123. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Candal Elpenord/
Examiner, Art Unit 2616

/Kwang B. Yao/
Supervisory Patent Examiner, Art Unit 2616